CALFED Bay-Delta Program Project Information Form

Watershed Program - Full Proposal Cover Sheet

1. Full Proposal Title: Lagoon Valley Watershed Restoration
Concept Proposal Title/Number: WSP01-0001
Applicant: City of Vacaville - Community Services Department
Applicant Name: Robert Farrington, City of Vacaville -Community Services Department
Applicant Mailing Address: 40 Eldridge Avenue, Suite 14, Vacaville, CA 95688
Applicant Telephone: 707/449-5656 Applicant Fax: 707/449-5649
Applicant E-mail: Bfarrington@ci.vacaville.ca.us
Fiscal Agent Name (if different from above): Same as above
Fiscal Agent Mailing Address: _____
Fiscal Agent Telephone: _____ Fiscal Agent Fax: _____ Fiscal Agent Email: _____

2. Type of Project: Indicate the primary topic for which you are applying (check only one)

_____Assessment	_____Monitoring
_____Capacity Building	_____Outreach
_____Education	_____Planning
___X_Implementation	_____Research

3. Type of Applicant:

_____Academic Institution/University	_____Non-Profit
_____Federal Agency	_____Private party
_____Joint Venture	_____State Agency
__X__Local Government	_____Tribe or Tribal Government

4. Location (including County):
What major watershed is the project primarily located in:
_____Klamath River (Coast and Cascade Ranges)
_____Sacramento River (Coast, Cascade and Sierra Ranges)
_____San Joaquin River (Coast and Sierra Ranges)
___X Bay-Delta (Coast and Sierra Ranges)
_____Southern CA (Coast and Sierra Ranges)
_____Tulare Basin (Coast, Sierra and Tehachapi Ranges)

5. Amount of funding requested: $ 431,000.00
Cost share/in-kind partners? ___X Yes _____No
Identify partners and amount contributed by each: City of Vacaville - $341,000.00

6. Have you received funding from CALFED before? _____Yes _X___No
If yes, identify project title and source of funds:

By signing below, the applicant declares the following:

1. The truthfulness of all representations in their proposal
2. The individual signing this form is entitled to submit the application on behalf of the applicant (if the applicant is an entity or an organization)
3. The person submitting the application has read and understood the conflict of interest and confidentiality discussion in the Watershed Program Proposal Solicitation Package and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant, to the extent provided in the Proposal Solicitation Package.

_____
Printed name of applicant

_____
Signature of applicant

1. Describe your project, its underlying assumptions, expected outcomes, timetable for completion, and general methodology or process.

Lagoon Valley is located within a 670-acre area of continuous open space and regional parkland owned by the City of Vacaville in Solano County. The site is situated between the Vaca Mountains to the west and the Laguna Hills. The City of Fairfield and Vacaville are west and east of the watershed. Streams impacted by this watershed are Alamo, Putah, Laguna and Ulatis Creeks. The project is in Solano County.

Current status of resource conditions includes deterioration and putrefaction of the lake, wetlands & riparian areas. Fisheries of the lake, exiting riparian areas and streams have declined due to extensive sedimentation deposits from the surrounding watershed. LSA Associates, an environmental consulting firm, completed a specific Lagoon Valley Lake Management Plan dated October 13, 1999. The plan identified conditions, design, study results, recommendations, cost analysis and regulatory considerations. The State Department of Fish and Game (DF&G) has actively monitored the fisheries of the lake and noted continual degradation and sedimentation of the lake.

The upper watershed comprises the zone between the base of the adjacent hills to the tops of the ridgelines (elevation range - approximately 300 feet to 800 feet NGVD). It consists of relatively steep, sloped terrain containing numerous drainages, gullies and small canyons. The upper watershed appears to be a major source of sedimentation to the lake. Many drainages are somewhat incised, have obvious headcut problems and lack stabilizing vegetation along channel slopes. Hillside slump areas are also found. Evidence of the degree of sedimentation flowing down the drainages is found in the upper storm collection system where large volumes of sediment collect annually.

The **expected outcome** is to:
1) Initiate a localized sediment capture system.
2) Improve water quality to lake, drainages and downstream impacts.
3) Restore wetland/riparian areas.
4) Initiate remedial actions for a quality watershed.
5) Educate and inform the watershed stakeholders

The anticipated outcome is the immediate and long-term reduction in point and non-point sediment production into the Lagoon Valley and associated waterways eventually impacting the Bay Delta. Other outcomes that are expected are reduced erosion and soil loss, improved water quality, and restoration of vegetative cover and improved education of public and private entities about watershed restoration.

We will use current best management practices to achieve the desired results. The selective measures of construction were determined by collaborative efforts and input from DF&G, Public Works, Planning, City Engineers and professional consultants dealing with range management, riparian restoration, hydrology and lake management.

Additionally, this project proposal provides for grant/project administration, environmental permits and compliance, monitoring, and public education and outreach.

The timetable for completion of this is approximately 18 to 24 months. The process for restoration is as follows:

Upper Watershed Management (Exhibit D, Figure 17) - In order to control the sources of upper watershed sedimentation to the lake, an integrated set of upper watershed management actions will be implemented. Soil stabilization will include the following: removal of side cast fill material from roads and trails; provide geoweb and/or rock to plant areas considered ‘critical erosion’ zones; rock armor critical road drainage crossings; install rock out-fall at ephemeral drainages and re-vegetate areas within watershed drainages critical to lake in-flow zones.

The upper watershed area, particularly in DB-1, (Exhibit D, Figure 5), is characterized by eroded drainages, often with somewhat incised channels and headcut problems. Grass cover and vegetative cover along drainages appear to be minimal due to cattle grazing impacts.

The following upper watershed management program is proposed to mitigate these problems. The program is intended to comprise an *integrated* set of actions.

Drainage Stabilization - Several drainages in the upper watershed will benefit from stabilization actions. This involved a physical assessment of all significant drainage channels in the watershed and development of stabilization prescriptions for each. Stabilization options include:

- earth moving work to establish more stable channel cross sections and/or to stabilize headcuts,
- placement of rock riprap into headcuts and along channel slopes,
- construction of rock riprap drop structures at critical grade breaks along channels,
- placement of riprap or geotextile retaining materials along key segments of erosion.

Trail/Fire Road Assessment and Maintenance - The entire trail and dirt road system in the watershed has been inspected for areas of existing or incipient erosion. Repairs and preventative measures will be implemented such as:

- removal of outslope materials and stabilization of road and trailside slopes.
- retaining structures, drainage diversion and routing structures.
- physical blockage of trails for the prevention of access.
- ripping and revegetation of unauthorized trails.

An assessment has been made regarding the fact that some trails will be limited to hiking use only, while others are too erosion-prone for mountain bikes and horses. Use of motorized vehicles (including motorcycles) is limited to paved surfaces only.

Grazing Management Plan and Actions - A grazing management expert was retained to assess the current grazing regime of 2500 acres and to develop an overall plan (Exhibit A) designed to achieve the following goals:

1. Determine optimal grazing densities based on desirable levels of residual dry matter in the grasslands at the beginning of the rainy season during an average rainfall year.

ACTIONS: The overall need for grazing as a management tool for fuel reduction was determined to be crucial for watershed protection. Grazing will generally occur from March 1 through July 31, depending on climatic conditions for a given period.

2. Assess and modify livestock rotations to ensure that all portions of the watershed retain sufficient grass cover to minimize erosion.

ACTIONS: This requires additional division of the watershed into several sections. A grazing regime will be implemented that allows one or more sections to be grazed while other sections are “rested” for an adequate period of time and will allow the grassland vegetation to recover in the non-grazed sections. Watering structures will be located away from riparian areas, to ensure cattle exclusion at sites in the lower elevations with gentler slopes less prone to erosion.

3. Timing is critical regarding cattle duration in the watershed.

ACTIONS: Dependent upon climatic conditions, the cattle will enter the area in March and be removed in early summer. Sheep are not out of the question if a qualified shepherd controls their movements through phasing in and out of high feed areas. In essence, proper handling of livestock will eliminate over grazing in the ravines and provide reduction of grasses for total watershed protection.

2. Describe your qualifications and readiness to implement the proposed project.
    a. Describe the level of institutional structure, ability and experience to administer funds and conduct the project. Identify the fiscal agent responsible for handling the funds.

The City of Vacaville is organized on a department basis. The services provided include the City Managers Office, Office of Housing and Redevelopment, Administrative Services, Community Development, Police, Fire, Community Services and Public Works.

The Community Services Department is the lead department for administering this project. The Park Planner (City Landscape Architect) will oversee the long-term maintenance and administration of the grant project and has 20+ years of experience. The City of Vacaville has 28 Park Maintenance Workers (full-time staff) and 14 seasonal personnel that are trained in all aspects of horticulture (tree and shrub care, use of pesticides, etc.). The City of Vacaville has 36 park facilities ranging from small tot lots to an impressive 400+ acre regional park site. Over the past 26 years, extensive plantings have been completed at 19 neighborhood parks, seven (7) community parks, six (6) recreation centers and over 2,000 acres of greenbelts and open space.

The Administrative Services Department is responsible for the City's accounting systems and coordinates all fiscal proceedings and operations. This department has administered accounting practices for a variety of grants extensively over the past years. The very first mayor of Vacaville began in 1892. Needless to say, the city has dealt with numerous grants and project financing since that time.

b. Describe technical support available (including support needed for environmental compliance and permitting) to begin and complete the project in a timely manner.

For development and design of the overall watershed/lake management plan in 1998-2000, the City obtained the services of a consulting environmental team that consisted of firms with the following expertise:

1. *Hydrogeology* - hydrological, HEC modeling, sedimentation and erosion aspects of watershed analysis;
2. *Civil Engineering* – geotechnical studies, preliminary design of watershed improvements;
3. *Aquatic Biologist* – nutrient and bacterial analyses of surface waters within watershed streams; fisheries studies;
4. *Ornithology* – bird use observations and habitat studies;
5. *Herpetology* – California red-legged frog surveys of the watershed;
6. *Wetlands* – wetland characterization and mapping, wetland and riparian habitat restoration and design;
7. *Rangeland Management* – impacts from existing cattle grazing; options for eliminating impacts with improved grazing management;
8. *Regulatory* – requirements under Section 404, Endangered Species Act, California Section 1603 and 2081, Regional Water Quality Control Board, State Division of Safety of Dams and Solano County.

The City intends to obtain the services of the same or a comparable consulting team for detailed construction design and implementation of the project.

The City of Vacaville processes CEQA and NEPA in house. Other regulatory permits are handled by each issuing department. In this case the Community Services Department will be responsible for the permits. The California Department of Fish and Game is currently reviewing plans and concepts. This department will continue to be intimately involved in final construction drawings. Other technical support will come from City of Vacaville public works, planning and administrative services departments. The Solano Irrigation District, Vacaville Tree Foundation, Solano Open Space Council, USF&WLS, DF&G, and CALFED staff, with possibly UC Davis, will contribute toward and review final design concepts.

Regulatory Approval **-** Improvements will likely require a Corps of Engineers Section 404 permit.

Additionally, the USF&WS will provide specific comments and recommendations upon the effects of a proposed Corps permit on wildlife and wetland functions and values. RWQCB Section 401 Water Quality Certification (or waiver thereof) and a CDFG approval will also be required.

c. List any previous projects of this type you or your partners have implemented, funded either by CALFED or other programs.

We have received funding from the Habitat Conservation Fund for riparian restoration work along several creeks in Vacaville but have not had funding for this specific watershed improvement program or others.

3. Provide a completed budget cost sheet and describe the basis for determining project costs, including comparisons with other similar projects, salary comparisons, and other listed costs. Include all costs of environmental compliance, such as CEQA and/or NEPA, and permits. Describe how the approach to achieving the stated goals of the project demonstrates an effective cost relative to its anticipated benefits.

Please see attached budget sheets.

4. Describe the technical feasibility of the proposed project.
   a. Describe any similarity to previously implemented successful projects in this community or elsewhere.

The proposed project involves watershed stabilization and ecological enhancement techniques similar to those successfully applied elsewhere in Solano County and throughout California. For example, numerous watershed management plans have used or are currently using cattle exclusion from stream corridors to promote stream stabilization and riparian vegetation re-establishment. In combination with other stabilization and management actions, cattle exclusion can be a powerful tool for watershed improvements. Examples of cattle exclusion efforts include on-going management at The Nature Conservancy's (TNC) Cosumnes River Preserve and Kern River Preserve, the Upper Stoney Creek Preserve and the Deer Creek Preserve (Deer Creek Watershed Conservancy). Modified grazing regimes that have excluded or reduced cattle grazing have effectively promoted oak woodland regeneration within watersheds such as the Vacaville Hidden Valley Open Space Preserve (Bernhardt and Swiecki 2000), Big Chico Creek (UCD-ICE 1997), and The Nature Conservancy's Lassen Foothills Project (TNC 1999). Finally, properly managed grazing regimes have been used to improve the cover and diversity of native wildflowers within annual grassland sites such as at the TNC Vina Plains Preserve (Macon 1999) and the Jepson Prairie Preserve.

Bioengineering techniques proposed under this project for stabilization of watershed streams and drainages are techniques that have been successfully used throughout California. Examples include watershed stabilization work at Big Chico Creek (UCD-ICE 1997), the Feather River CRM (Harris 2000), Cottonwood Creek, Elkhorn Slough and Carmel River (UCD-ICE 1997).

   b. If the project proposes a new approach or new method with a high likelihood of adding new knowledge and or techniques, or with the potential to fill identified gaps in existing knowledge, describe how it will do so, and what monitoring components will provide substantiation of results.

We do not foresee new implementation methods but could very well be utilizing state-of-the-art products for sediment control. If this occurs, all stakeholders will be apprised.

   c. Explain how the finished project will be maintained as necessary, and to what degree it may require continued funding from outside the community.

The city will maintain the project improvements with city staff as mentioned in Item 2.a above. We do not anticipate additional funding upon completion of the watershed improvements. Monitoring will be on going and in a manner that will allow quick remedial action to any problems that occur. Costs will most likely be appropriated within the city's framework if needed.

5. Describe how the monitoring component of the project will help determine the effectiveness of project implementation and assist the project proponent and CALFED with adaptive management processes.

a. Identify performance measures appropriate for the stated goals and objectives of the project.

Performance measures shall reflect the overall project goal of restoring the Lagoon Valley Lake Watershed. Monitoring shall be designed to detect trends in the post-project system on both a spatial and temporal basis so that needed adjustments and refinements in the plan can be made when needed and in the specific locations needed. Key performance measures shall include but not be limited to the following:

1. Sediment Volumes - *There should be significant decline in the volume of sediment reaching Lagoon Valley Lake, Laguna and Alamo Creeks at the mouths of each intermittent and perennial stream.*

2. Stream Cross Sections – *Stabilized stream segments should remain stable or should evolve over the monitoring period in the direction of stability. There should be no evidence of new significant downcutting, rill formations or formation of new headcuts.*

3. Sediment Accretion - *Following initial stabilization there will likely be evidence of accretion in key stream locations such as riprap check dams and plunge pools. Over time, the rate of accretion should decline as the stabilized system matures*

4. *Wetland Vegetation Establishment* – Within the flatter and broader portions of stabilized stream zones, and within seeded areas, cover by hydrophytic herbaceous species should expand.

5. Woody Riparian Establishment – *Planted zones of woody riparian vegetation should show evidence of maturation and canopy cover expansion over the monitoring period.*

6. Erosion Seed Mix Establishment – *Seeded sideslopes and other graded areas along the stabilized streams should rapidly germinate and expand cover.*

7. *Oak Establishment* – Planted zones of oaks in the watershed should demonstrate a reasonable level of survival and maturation.
8. *Grassland Condition* – There should be a reduction in eroded, over-grazed conditions in the watershed.

The following five basic goals and related monitoring performance measures are:

1) Initiate a localized sediment capture system.
2) Improve water quality to lake, drainages and downstream impacts.
3) Restore wetland/riparian areas.
4) Initiate remedial actions for a quality watershed.
5) Education and Outreach

The monitoring performance measures will be the effectiveness of the stabilization effort in reducing and controlling erosion, sedimentation, excessive runoff and sediment capturing.

The measures implemented will be the actual monitoring of stream courses recording sedimentation and turbidity of the drainages as well as the presence of non-eroded surface areas throughout the watershed. Photos of watershed elements, which have degraded the site, will be compared with long term implementation strategies (timeline photography).
The monitoring team will review current eroded surfaces, drainages and vegetative cover and measure rill depths, percentage of canopy cover and stream flow regimes.

In essence, the monitoring team will contrast current detrimental conditions of the watershed with proposed remedial actions and their long-term impact for rehabilitation of the watershed.

We will measure the time lapse of vegetative restoration of road and trail closures. We will observe and note the effectiveness of stabilization options as well as the presence of non-eroded surface areas within de-commissioned roads and trails by contrast and comparison with current conditions.
The team will measure current feed density of the grasses, reduction in grazing impacts to the drainages, improved riparian conditions, reduction and/or elimination of cattle eroded areas, and a more definitive number for AUM's appropriate to the areas.

We will measure by actual monitoring and recording numbers and types of native regeneration trees and shrubs and herbaceous species within the ravines. Success will be measured throughout the years as progress reports divulge the success or failure of the restoration improvements. Annual reports will include required maintenance needed for watershed stability, physical repairs, required materials and equipment.

The special interest groups, stakeholders and schools will assist in monitoring vegetative growth, site suitability, and plant effectiveness within the watershed.

b. Describe how this project will coordinate with and support other local and regional monitoring efforts.

Monitoring results will be shared with monitoring conducted under the on-going Solano Water Agency Regional Habitat Conservation Plan, other on-going watershed enhancement and restoration efforts in Solano and Yolo Counties (*e.g.,* Cache Creek, Lake Solano, Lower Putah Creek), the pending Rockville Hills Regional Park Management Plan, and on-going management efforts at the Jepson Prairie Preserve. Results will also be shared with the UC-Davis Information Center for the Environment for posting on their web site.

We understand that this watershed is quite unique to this area. The city will avail efforts of this project with work proposed by Yolo County, Contra Costa Flood Control District and the Amador County Resource Conservation District. These entities have multiple partners too and we are most willing to collaborate with their proposals to enhance everyone's needs.
In addition, the city has been involved with stream restoration work on Alamo, Ulatis and Laguna Creeks. This watershed directly impacts Laguna and Alamo Creeks, which are currently reviewed for their stream flows and riparian conditions.

c. Provide a description of any citizen monitoring programs that will be part of this project.

The Community Services Parks and Recreation Commission in conjunction with the Vacaville Unified School District, Vacaville Tree Foundation, Solano Irrigation District and the Solano Open Space Committee will be the key participants at the local level. The local Fish and Game biologist will be intimately involved due to his current involvement in the Phase I Management Plan. Our plan is to develop teams to assess the watershed rehabilitation work.

d. What monitoring protocols will be used, and are they widely accepted as standard protocols?

The monitoring program will use standard protocols for wetland and watershed monitoring. These are summarized as follows:

1. *Geomorphic Cross Sections* - These cross sections will be will be carefully placed at representative transition points where erosion or sediment deposition is most likely to occur. The cross sections will serve as a control for the map-based geomorphic interpretations, and will also provide the standard "hydraulic geometry" data to evaluate future stability or instability. Geomorphic channel monitoring will be conducted in the summers of years 1, 3, and 5 following stabilization.

2. *Photographic Monitoring* - The condition of the channels at selected, standard monitoring locations will also be documented annually by photography in order to assist in evaluating how the channel changes over time. If photopoints are used, they will be carefully chosen to minimize the possibility that vegetation may later obscure the view of the channel from that location.
3. *Suspended Sediment Volumes* – Suspended sediments will be measured in streams using a single stage sampler, or an equivalent apparatus, in coordination with stream flow measurements at suitable locations in the streams. At least one set of samples will be collected during each storm season during a large storm event.
4. *Bedload Sediment Volumes* – These will be estimated in years 1, 3 and 5 by measuring the depth of accumulated sediments at the mouths of each stream outlet and at key locations within the stabilized streams (e.g., plunge basins, cutoff walls, check dams).
5. *Vegetation Cover* - Quantitative-sampling methodology will be used to monitor vegetational parameters. To assess plant cover, random plots (quadrants) will be established in selected stabilized and seeded channel zones. Photographs will be taken of a representative selection of sampling plots in order to provide visual verification of estimation data. Cover will be estimated by absolute cover class for each species. Basal area cover by woody species will be combined with herbaceous cover in woody riparian habitats. Unequal cover class intervals allow for an easier estimation of species-cover to area relationships than do equal class intervals (Mueller-Dombois and Ellenberg 1974).
6. *Riparian and Oak Planting Survival* – Percent survival will be estimated annually by counting the number of live individuals during the growing season during each monitoring year.
7. *Residual Dry Matter (RDM)* – At the end of the growing season, RDMs should be measured in random locations in the grazed grassland areas. This parameter measures the amount of residue (*e.g.,* dead and decaying vegetation, duff) found in each vegetation type and provides a good indication if the modified grazing plan is meeting fuel reduction goals while not overtaxing watershed forage.

e. Describe how the type and manner of data collection and analysis will be useful for informing local decision making?

As the trends from monitoring results are analyzed, important management decisions will be made as to where and how erosion control measures can be made most effective in the Lagoon Valley lake watershed. Informed decisions should also become possible on the effectiveness of reduced grazing and grazing exclusion on oak woodland, woody riparian and scrub restoration. Results should also provide guidance as to the effectiveness of cattle exclusion from upper watershed streams with regard to intermittent and ephemeral stream stabilization and reduction in sediment volumes. A better understanding of the effectiveness of sedimentation control for protecting Lagoon Valley Lake and its associated native fish populations (Sacramento blackfish and Sacramento perch) should also be possible. Finally, monitoring results may shed light on a number of important watershed management questions in the Solano County area, including the efficacy of various bioengineering techniques within various stream erosion settings in the watershed.

The statistical data will be utilized by the city to amend work efforts if implementation of the tasks fail. All information received from the monitoring teams will be presented to the city council, DF&G and all associates with an analysis of the results and proposed corrections if needed.

6. If this project is to develop specific watershed conservation, maintenance or restoration actions describe the scientific basis for the action(s) described in the proposal. Include the following:
    a. Any assessment of watershed condition(s) that has already been developed by you or others.
    b. Previous assessment(s) used to establish your project goals and objectives, or to inform the basic assumptions of your proposal.

An extensive analysis of current watershed conditions was performed in 1998-1999 in support of the Lagoon Valley Lake Management Plan (LSA Associates 1999, copy enclosed). Sources of sedimentation and erosion problems were mapped; tributary streams were assessed as to erosion, flow and nutrients; watershed hydrological and biological characteristics were analyzed and sensitive habitats mapped. The watershed management actions proposed in this submittal constitute one key group of recommendations of the overall lake management plan. The 1998-1999 studies are discussed in the attached plan (LSA Associates 1999) and are listed below:

These are briefly summarized below:

1. Field investigations and mapping of sources of watershed runoff sources and patterns;
2. Flow routing and HEC-1 modeling of watershed runoff for all individual sub-basins in the watershed; peak flow discharges to the lake under 100-year storm conditions;
3. Calculations of lake water holding capacity and seasonal water losses;
4. Calculations of lake water surface elevations under 100-year storm;
5. Lake and stream water quality sampling and analysis (sediment and water column nutrients; coliform bacteria, pH, conductivity, temperature, turbidity, dissolved oxygen);
6. Investigations of major sources of nutrient sources within the watershed following storm events;
7. Calculations of lake sedimentation rates based on bottom depth changes over two decades;
8. Mapping of erosion problem areas;
9. Fish trapping studies to determine Sacramento blackfish and Sacramento perch age-class distributions;
10. Waterfowl and shorebird surveys; and
11. Mapping of wetlands, riparian habitats and special status species observations.

In 2000-2001, following approval by the City Council of the lake management plan, three additional technical studies were undertaken. These were:

1. A second year of water quality studies (nutrients following storm events);
2. Sampling and analyses of lake sediments for the potential; presence of toxic compounds;
3. Lake sediment characterization study;
4. California red-legged frog surveys of the entire watershed and the lake; and
5. Grazing – grazing-vegetation study, fuel load assessment and preliminary grazing management recommendations.

c. A description of the scientific assumptions used to develop the project goals, objectives and proposed actions, and the degree to which those assumptions are widely accepted (both in the science community as a whole and in the watershed community).
d. A discussion of how the proposed actions are (are not) consistent with the scientific assumptions and previous assessments completed in the watershed.
e. A description of what baseline knowledge was used to support the management actions described in the proposal, or the likelihood that the management actions will generate more robust baseline knowledge.

Our proposed project is founded in extensive on-site studies performed within the Lagoon Valley Lake Watershed (see above response to questions 6a and 6b). None of our proposed management actions are based on “assumptions” about existing conditions but rather are based on direct observations and data analysis. For example the rate of sedimentation from the surrounding watershed has been measured and the specific source of the sediments (the actively eroding ephemeral and intermittent streams in the watershed), has been verified.

The expected effectiveness of proposed management actions are based on a number of commonly accepted and applied practices for watershed restoration. The extent to which these practices are based on assumptions versus scientific observations and experimental studies, is beyond the scope of this proposal. However, in general, our proposed management practices have a firm basis in the technical literature and scientific studies. For example, our proposed stream stabilization measures are fundamental practices for treating non-urban streams that suffer form active erosion problems. Key elements of our stabilization plan include headcut stabilization with rock riprap and geotextiles as appropriate; placement of cutoff walls to

prevent upstream migration of headcuts, laying back of incised banks and seeding; planting of stabilized zones; and installation of rock riprap plunge basins.

These measures are recommended for stream stabilization by widely accepted manuals (Federal Interagency Stream Restoration Working Group 1998; Darby and Simon 1999).

Our proposal to exclude cattle from tributary streams is another conventional and commonly recommended practice for watershed stabilization. For example, the California Water Resources Control Board recommends establishing buffer zone around streams to control sedimentation and other non-point pollution in rangelands (State Water Resources Control Board 1995). Various authors have discussed the value of excluding or reducing cattle as a means of promoting woody riparian regeneration (Platts 1976, Shanfield 1984).

The Lagoon Valley upper and middle watershed is particularly suited for a comprehensive watershed management plan that combines stream stabilization with cattle exclusion from stream corridors, and grazing management in the non-excluded grasslands. Soils are primarily Dibble-Los Osis clay loams derived from sandstones (SCS 1977). They are rated by the SCS as “severely limited” due to a high erosion potential. As such, they are very susceptible to erosion from trampling, and long term grazing that can lead to ever-worsening process of headcutting, gullying, and slumping. Watershed stabilization could not be feasible accomplished without attention to past grazing practices.

The scientific literature also supports the assumption that the Lagoon Valley watershed’s grasslands will respond favorably to grazing management that properly limits the timing of grazing. For example, the density and vigor of the common native perennial grasses in California annual grassland can improve when intensive spring grazing is curtailed just prior to the period of inflorescence elongation and seed set of existing perennial grasses (Menke 1992). This process removes much of the density of non-native annual grasses until their growing season is near its end, but allows time for native perennial grass growth and flowering before soil moisture is exhausted. Observations comparing adjacent grazed and ungrazed sites have shown that grazing improved the cover and displays of native wildflowers (Edwards 1992), and properly-timed grazing has been prescribed to benefit wildflowers in grasslands at places such as theTNC’s Vina Plains Preserve (Macon 1999).

7. A. How will the proposal address multiple CALFED objectives (see Section I) in an integrated fashion, with emphasis on water supply reliability, water quality, ecosystem quality, and levee stability objectives CALFED has established for Stage 1 of the program?

- Ecosystem Quality – Degradation of the ecosystem by erosion, inflow of sediments to lower watershed and lake, possibility of influence by local nursery (previously suspected but now determined to have inconsequential influence), grazing influence, depletion of riparian zones, and elimination of selective habitat have been major factors that prompted action by the city to correct the overall ecosystem. We will improve and increase aquatic and terrestrial habitats and improve ecological functions within and outside the watershed. Our actions will initiate recovery of ecosystem health by reducing and eliminating factors that degrade habitat, impair ecological functions and reduce population size and health of species.
  The degradation of source water at the site will be reduced and possibly eliminated.

- Water Supply – The supply of water draining from this project toward the delta will be enhanced by improvements within the watershed, which will result in improved flows due to corrective actions, which impede current flows. Obstructions will be removed along riparian corridors and the eventual deepening of Lagoon Lake will aid in release and impoundment of waters impacting Laguna and Alamo Creeks. The implementation efforts will slow runoff and allow water to infiltrate the soils. Our activities will restore and enhance the watershed ability to absorb, store and release water.

- Water Quality - The intended watershed improvement activities will benefit water quality by the identification (previously accomplished) and control of point and non-point source pollution. We will also reduce and control pollutant loads throughout the system by the actions spelled out in the budget.

B. Explain how the proposal will help define and illustrate relationships between watershed processes (including human elements), watershed management, and the primary goals and objectives of the CALFED (see Section I).

This project combines critical elements of a watershed. The area is actively open for recreation such as fishing, hiking, nature study, picnic and camping, open field play and general day use activities. The watershed provides grazing, water quality and quantity issues, fire protection, communications (radio and telephone transmission towers), historic values, lake and riparian habitats.
Pertinent to CALFED, the watershed relates directly to the six primary objectives on pages I-7&8 of the Watershed Program Plan. These include facilitation, coordination and collaboration of local watershed stakeholders, monitoring, education and outreach, integration with CALFED, complying with and complimenting CALFED watershed processes, goals and objectives and insuring long term stability of the watershed at Lagoon Valley.

With the above mentioned CALFED primary objective in mind, their relationship to human elements include active participation of individuals (public and private) in the stakeholders group for monitoring and assessment, education, exposure to the CALFED program and long term sustainability of the Lagoon Valley Watershed. Again, active recreation and public use of the area allows participants a first hand opportunity for education and interpretation of watershed improvement impacts. The overall relationships will be dependent upon the others. This can best be illustrated by envisioning a triangle with the points being human, management and CALFED goals. This triangle comprises the watershed ecosystems. We will continually strive to keep this triangle intact by integrating the three elements throughout the life of this project and in perpetuity.

c. Identify a lead agency for environmental compliance, such as CEQA or NEPA. Describe the program's strategy and timetable on environmental compliance.

The city is the lead for all environmental documents and has completed CEQA documents necessary for the successful completion of this project.

8. Describe any other important aspects of your program that you could not address in the above items, and that you feel are critical to fully describing your project.

Submit all requested forms, including those not included in this Proposal Solicitation Package, and needed for the project.

This project will correct upper watershed problems. Additional improvements for future phases include intermittent drainage channel stabilization, lake dredging, creation of new wetlands, shoreline stabilization, riser on dam spillway, bypass channel dredging, trail and boardwalk and ancillary items. We anticipate approximately $1M in support for the above from the Wildlife Conservation Board. Our legislative representative, Helen Thompson, is pushing hard for additional funds to complete the project.

The city has collaborated with National Grant Services (NGS), which actively solicits funding from state, federal, private and corporate funders. This mechanism (NGS) is a valuable partnership readily available to other CALFED partners.

CALFED WATERSHED PROGRAM BUDGET ESTIMATE AND PROJECT SUMMARY II
LAGOON VALLEY WATERSHED

Task			Completion Qtr / Year	Match	Grant	Total
Administration						
a)	Project coordination		2/03	$ 6,000	$ 48,000	$ 54,000
b)	Records & reports		2/03	92,000	-0-	92,000
c)	Engineering design		3/02	60,000	25,000	85,000
d)	Supervision & meetings	2/03	10,000	10,000	20,000	
e)	Bids & documents		4/02	20,000	-0-	20,000
f)	Permit		3/02	-0-	8,000	8,000
Sub Total				**$188,000**	**$ 91,000**	**$279,000**
Upper Watershed Restoration						
a)	Drainage stabilization		3/03	-0-	$120,000	$120,000
b)	Erosion control	3/03	-0-	65,000	65,000	
c)	Trail and road restoration		3/03	-0-	50,000	50,000
d)	Grazing Plan Development		4/01	3,000	-0-	3,000
e)	Cattle exclusion fencing	1/02	-0-	105,000	105,000	
f)	Maintenance, repair &	insp.	On-going	150,000	-0-	150,000
Sub Total				$153,000	$340,000	$493,000
Grand Total				$341,000	$431,000	$772,000

The approach to achieving goals in a cost effective manner was based upon past practices of similar projects undertaken by the environmental consultants. Bids for actual work was reviewed and specific tasks were accomplished based upon quality work effort and associated costs. The above budget figures are representative of quotes received from various vendors and actual costs incurred by the city for services rendered.

Final outcome of the proposed budget figures will be determined upon completion of construction documents, bid selection and actual administrative costs. We will adjust budget figures to represent costs at and during time of project implementation.
The long term benefits could be measured using a formula utilized by the State Department of Boating and Waterways for recreational use only. This would be:

Total vehicles per year X $5 per vehicle benefit = Total recreational benefit
OR
24,000 vehicles X $5 = $120,000/year X 25 year = $3 million

This alone justifies the costs but other issues such as water quality, ecosystem restoration, public education, increased flora and fauna and fisheries restoration could be broken down in a similar formula to derive at an estimated benefit for each of these disciplines.

Task Products - Success / Administration

a) Project coordination

This will entail complete coordination of all elements required for restoration of the upper watershed. The coordination will be under the direction of the City of Vacaville, Community Services Department in conjunction with an environmental consulting firm. Items b) thru f) as listed in the above budget will be overseen by the coordinators.

Success will be measured by timely completion of reports, engineering design, general supervision, effectiveness of meetings and their required frequency, lack of hinderances in preparing, submitting and awarding bids and completion of permits in a sequencial manner appropriate to project implementation. ***The ultimate aim will be for the coordinators to connect all facets of this project to the primary program goals and objectives as outlined in the CALFED Watershed Program Plan.*** To insure that our project tasks are successful, we will require that the coordinators read and review this plan and specifically the Watershed Program Elements.

b) Records & reports

The city contracted with LSA Associates to conduct an extensive study of the watershed and lake at Lagoon Valley. The study was completed in June of 1999 at a cost of approximately $82,000.

The city incurred expenses of approximately $98,000 for review, research, data dissemination and administration of this Lagoon Valley Watershed Study. The City Council adopted an extensive capital improvement plan to correct the water quality and sedimentation problems associated with the lake and surrounding watershed. All elements of this application are those approved for adoption by the City Council.

Success will be measured by timely completion of reports. This has been demonstrated already by the completion of the Lagoon Valley lake Management Plan, Grazing and Vegetation Plan, Recreation and Public Access Plan, Red Legged Frog Study, Lake Sediment Testing and previous environmental documents required for other projects in the area.

It is the above mentioned report that we are using for this phase of implementation work at lagoon Valley. The city has expended and contributed in excess of $250,000 in man hours, reports, studies and assessments for this multi phase project.

During this upper watershed management implementation phase, we will continue to process documents required of CALFED, the city and other entities involved.

c) Engineering design

Specific design work is now required to carry out the implementation phase for this upper watershed restoration. City staff and an outside contractor will develop and finalize the required drawings necessary to implement the actual construction phase of this work.

Success will me measured by timely completion of engineering and construction drawings enabling a rapid transition from the drawing board to field work required for actual construction. Success will also be measured by collection of data and input from special interest groups for the specific design elements within the construction drawings.

d) Supervision & meetings

Approximately 3 meetings per month will be held to allow all interested parties an opportunity to provide input for this implementation phase. On-going meetings will be frequent between consultant and city staff to insure project flow and continuity. The City Landscape Architect will supervise and coordinate the meetings and communications necessary for a successful project.

Success will be measured by recording information gathered at the meetings, attendees, effectiveness of the meetings and an understanding of all participants of this project to the primary program goals and objectives as outlined in the CALFED Watershed Program Plan.

e) Bids & documents

The city will develop bid documents based upon the completed engineering drawings. The engineering documents will be circulated internally for review by various departments such as engineering, public works, community development, and city manager. Externally, all required state and federal agencies will receive copies as will Vacaville-Dixon Greenbelt Authority, Solano Irrigation District, Solano Water Authority, Vacaville Unified School District and other interested parties.

Success will be determined by the award of contract work to a bidder that is within the means and scope of the budget. We will also measure success by the number of responses received from the various entities reviewing the documents. (i.e. number returned vs. number submitted for review).

f) Permits

This represents an $8,000 increase in our budget request above what was indicated in out pre-proposal. A Corps Section 404 delineation will be secured for this project. CEQA will be completed in-house.

Success will be measured by a timely completion of permit request and receipt of the permit well in advance of project construction. In essence, time will be the criteria.

Task Products - Success / Upper Watershed Restoration

a) Drainage stabilization - Stabilization options include:

- earth moving work to establish more stable channel cross sections and/or to stabilize headcuts,
- placement of rock riprap into headcuts and along channel slopes,
- construction of rock riprap drop structures at critical grade breaks along channels,
- placement of riprap or geotextile retaining materials along key segments of erosion.

The actual finished product and the effectiveness of the stabilization effort in reducing and controlling erosion, sedimentation, excessive runoff and sediment capturing will measure success. The criteria will be the actual monitoring of stream courses recording sedimentation and turbidity of the drainages as well as the presence of non-eroded surface areas throughout the watershed.

b) Erosion control

An excess of one million square feet of unstable soils will be seeded and plugged with a prescribed mix of native grass seed and perrenials. This seeding will also occur on areas where non-native, invasive plants have been removed.

The criteria for success will be the actual monitoring of previously eroded surfaces and their timely restoration of vegetative cover. We will observe and note the effectiveness of stabillization options as well as the presence of non-eroded surface areas throughout the watershed.

c) Trail and road restoration

The entire trail and dirt road system in the watershed has been inspected for areas of existing and/or incipient erosion. Repairs and preventative measures will be implemented such as:

- retaining structures, drainage diversion and routing structures.
- physical blockage.
- ripping and revegetation of unauthorized trails.

(This work will involve geoweb materials, compaction and vegetative cover for side slopes of trails and roads. Burms and stancions will be utilized to prevent usage of de-commissioned roads and trails. Structures could include rip-rap, gabions, culverts, natural headwall buffers and channelization of drainage areas).

Success will be measured by the time lapse of vegetative restoration of road and trail closures. We will observe and note the effectiveness of stabillization options as well as the presence of non-eroded surface areas within de-commissioned roads and trails.

d) Grazing plan development

A grazing management expert was retained to assess the current grazing regime of 2500 acres and to develop an overall plan (Exhibit A). The following items will take place:

- The overall need for grazing as a management tool for fuel reduction was determined to be crucial for watershed protection. Grazing will generally occur from March 1 through July 31, depending on climatic conditions for a given period.
- The watershed will be additionally divided into several sections. A grazing regime will be implemented that allows one or more sections to be grazed while other sections are "rested" for an adequate period of time and will allow the grassland vegetation to recover in the non-grazed sections. Watering structures will be located away from riparian areas, to ensure cattle exclusion at sites in the lower elevations with gentler slopes less prone to erosion.
- Dependent upon climatic conditions, the cattle will enter the area in March and be removed in early summer. Sheep are not out of the question if a qualified shepherd controls their movements through phasing in and out of high feed areas. In essence, proper handling of livestock will eliminate over grazing in the ravines and provide reduction of grasses for total watershed protection.

Success will be measured by feed density of the grasses, reduction in grazing impacts to the drainages, improved riparian conditions, reduction and/or elimination of cattle eroded areas, and a more definitive number for AUM's appropriate to the areas.

e) Cattle exclusion fencing

- Fencing (17,400 linear feet) will be constructed along the riparian corridor ravines to allow natural and/or artificial regeneration of riparian vegetation (Exhibit D, Figure 17). Exclusion of cattle will promote regeneration of native trees and shrubs and herbaceous species and therefore stabilize drainage corridors (in concert with the physical stabilization actions proposed below). Oaks, in particular, will regenerate successfully in areas excluded from cattle.

Success will be measured by actual monitoring and recordings of regeneration of native trees and shrubs and herbaceous species within the ravines. The criteria for success will also include the actual monitoring of previously eroded surfaces and their timely restoration of vegetative cover. We will observe and note

the effectiveness of stabilization options, (Item a) above), as well as the presence of non-eroded surface areas throughout the ravines and riparian areas.

f) Maintenance, repair & inspection

This budget item represents 25 years of city staff time, equipment and materials needed to maintain, inspect and repair the entire upper watershed improvements. This is based upon staff site visits of from 2 to 3 personnel per month for the 25 year period.

Success will be measured throughout the years as progress reports divulge the success or failure of the restoration improvements. Annual reports will include required maintenance needed for watershed stability, physical repairs, required materials and equipment.

The special interest groups and schools will assist in monitoring vegetative growth, site suitability, and plant effectiveness within the watershed.

As described in the CALFED Bay-Delta Program – Watershed Program Plan we will:

- Facilitate and improve coordination among governmental agencies, other organizations and local watershed groups by involving their efforts in our project. This has occurred in the past with such groups as the Vacaville Tree Foundation, Vacaville Unified School District, Department of Fish and Game, Wildlife Conservation Board and State Parks Local Assistance Programs.
- Develop watershed monitoring and assessment protocols
- Support education and outreach. Public awareness and local school involvement with monitoring, education and interpretive displays will go far in achieving our educational efforts for the watershed.
- Integrate and collaborate with other CALFED common programs. As a partner with CALFED we will actively communicate with them to insure cohesiveness and compatibility with their programs.
- Identify the relationships between watershed processes and the goals and objectives of CALFED